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# THE ROLE OF UNIVERSITIES IN NEW FORMS OF STRATEGIC RESEARCH COLLABORATION WITH INDUSTRY

Presentation at the Jena Economic Research Seminar, 19 June 2013

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# Outline / Research issues

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- Most prominent forms of regional engagement of German universities
- Evolution of new organisational models in university-industry interaction in the German research and innovation system
- Implications for universities

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# Underlying papers and projects

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- Koschatzky, K., Hufnagl, M., Kroll, H., Daimer, S., Dornbusch, F. and Schulze, N. (2013): Relevanz regionaler Aktivitäten für Hochschulen und das Wissenschaftssystem. In: Grande, E., Jansen, D., Rip, A., Schimank, U. and Weingart, P. (Eds.): *Neue Governance der Wissenschaft - Wissenschaftspolitik, Re-Organisation des Wissenschaftssystems und ihre Medialisierung*. Bielefeld: transcript Verlag (forthcoming)
- Koschatzky, K. and Stahlecker, T. (2010): New forms of strategic research collaboration between firms and universities in the German research system, *International Journal of Technology Transfer and Commercialization* 9, 94-110
- Koschatzky, K. (2013): *Heterogene Kooperationen im deutschen Forschungs- und Innovationssystem*. Stuttgart: Fraunhofer Verlag (in press)
- Regional network participation and their implications on the internal governance of universities (BMBF 2010 - 2013)
- Research Campus pro active - Exchange of experiences and integration: Accompanying research to the Research Campus programme (BMBF 2012-2016)

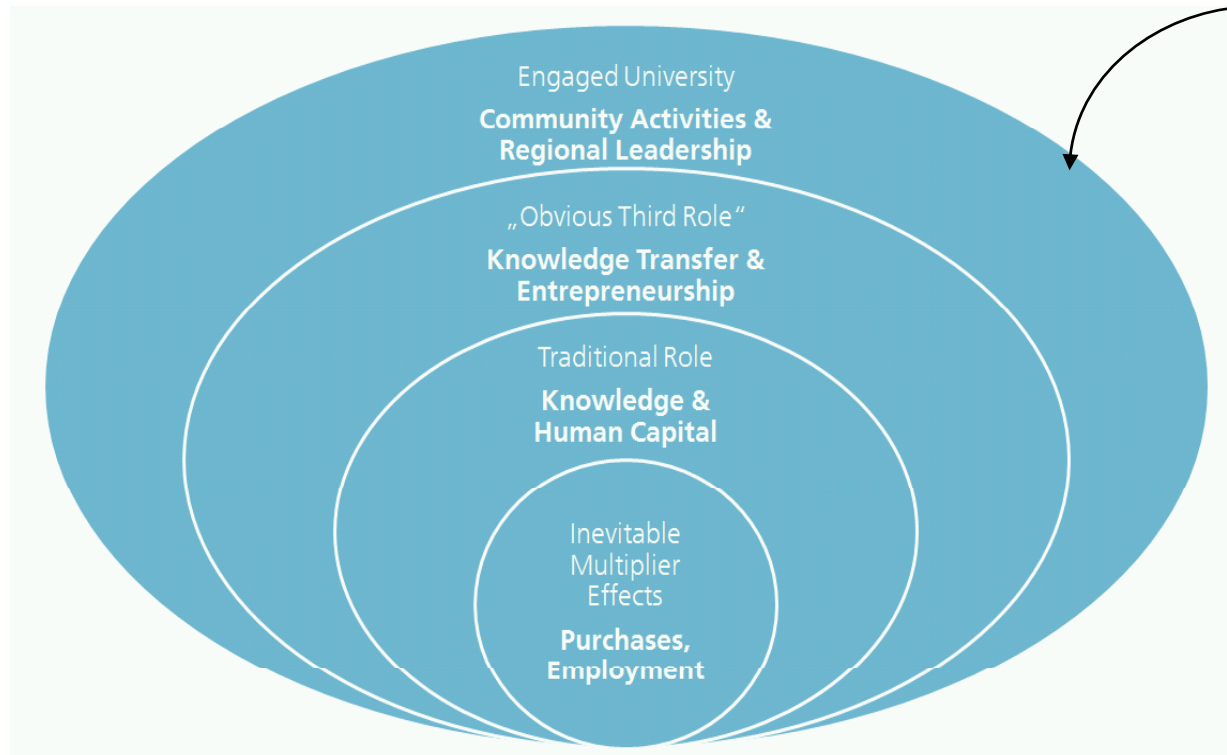
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# Different forms of regional university engagement

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- So far the **orientation of universities concerning their regional environment** has already been subject to many economic or social scientific research projects (Bleaney et al. 1992; Cooke 2002; Gunasekara 2006a; Keane und Allison 1999; Kitagawa 2004; Thanki 1999).
- Many universities **actively engage in their environment in a strategic manner** (Krücken et al. 2009; Krücken and Meier 2006; Nickel 2004).
- In this context the emergence of "**entrepreneurial universities**" (Clark 1998, Gibbs 2001) and the "**boundary-spanning roles**" of new university units (Youtie and Shapira 2008) are discussed, as well as the "**third role of universities**", i.e. their active contribution to regional development through knowledge spillovers from teaching and research (Gunasekara 2004; Westnes et al. 2007).
- In the wake of the **regionalization of RTD policies** the **expectations of policy makers** towards HEIs to engage in regional/local networks, clusters and other initiatives have significantly **increased** (Fritsch et al. 2007).

# Different forms of regional university engagement



- Regional governments try to **engage universities in joint strategic undertakings** of the industry, the science and the public sectors in a region
- Such initiatives can relate to the initiation of large scale cluster projects, to the formation of public-private-partnerships, as to urban development activities

Source: Kroll et al. (2012) based on Goldstein/Mayer/Luger (1995), Uyarra (2010) and others

# Forms of regional engagement

## Starting point

- No broad empirical basis on the full scope of activities
- Mostly econometric or case studies

## Objectives of the study\*

- Establish an empirical basis
- Take an actor based view
- Understand the reasons for researcher's choice

## Study Details

- Between April and June 2011
- Survey of about 15,000 professors (of ~40,000 German Total)
- 1,929 questionnaires with relevant entries returned, thereof 221 FH

Research, development and transfer oriented activities	Research and development co-operations with local partners
	<ul style="list-style-type: none"> <li>• Co-operation projects with joint teams,</li> <li>• Research projects that involve mutual learning,</li> <li>• Contract research (in the field of development and prototyping).</li> </ul>
	Consulting and Expert Reports
	<ul style="list-style-type: none"> <li>• Research on regional communities/institutions that involves a feedback to those institutions,</li> <li>• Consulting with specified objectives,</li> <li>• Contract research (in the field of expert reports).</li> <li>• Measures aimed at capacity building in regional institutions and firms.</li> </ul>
External use of university facilities	External use of university equipment and laboratories
	<ul style="list-style-type: none"> <li>• External use of laboratories for limited clinical trials,</li> <li>• External use of specialist equipment for material testing,</li> <li>• External use of specialist equipment for the analysis of samples.</li> </ul>
	External use of university premises and services
	<ul style="list-style-type: none"> <li>• Use of university premises and venue's for external events, with university sponsorship,</li> <li>• External use of generalist advisory services,</li> <li>• Graduate events / Employment fairs.</li> </ul>
Teaching related activities	Temporary personnel exchange between the university and regional partners
	<ul style="list-style-type: none"> <li>• Work experiences and internships for students,</li> <li>• Hiring of external readers and lecturers.</li> </ul>
	Writing of graduate thesis in co-operation with external partners
	<ul style="list-style-type: none"> <li>• Development of practical results that are of relevance for a regional firm,</li> <li>• Integration of a graduate to be in his or her future working environment.</li> </ul>
	Information events and further education for diverse groups (pupils, seniors etc.)
	<ul style="list-style-type: none"> <li>• Public lectures or seminars,</li> <li>• Applied civic education,</li> <li>• Education with respect to viable and suitable forms of community engagement,</li> <li>• Further education for disadvantaged groups,</li> <li>• Continuing education and live long learning.</li> </ul>
Activities related to regional engagement and regional leadership	Contribution to social life in the region / Community engagement in the region
	<ul style="list-style-type: none"> <li>• Expert contributions to specific discussions,</li> <li>• Contribution to public and media discourses,</li> <li>• Improving disadvantaged groups access to university facilities,</li> <li>• Contribution to social life in the region.</li> </ul>

\*financed by BMBF within the research programme 'New governance of science'

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# Definitions

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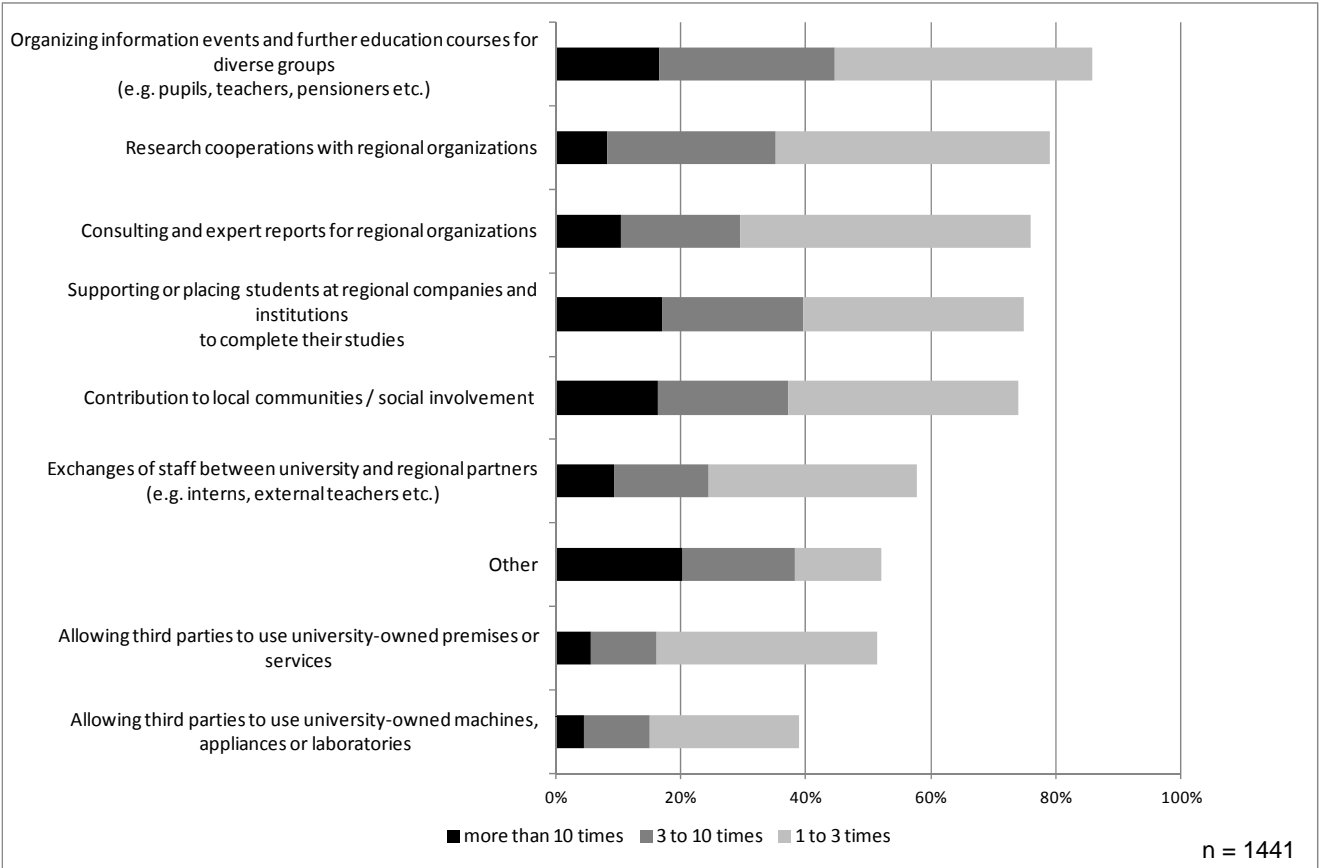
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- **Regional:** Wider environment of the location of a university that can be reached within two hours driving (car or train).
- **Regional activities** of universities: Engagement of university staff or the university in total which is based on regional networking according to the typology of regional engagement.
- **Networking / network:** z.B. „a number of actors who are linked via a number of relationships with a specific content“ (Wald and Jansen 2007: 93).



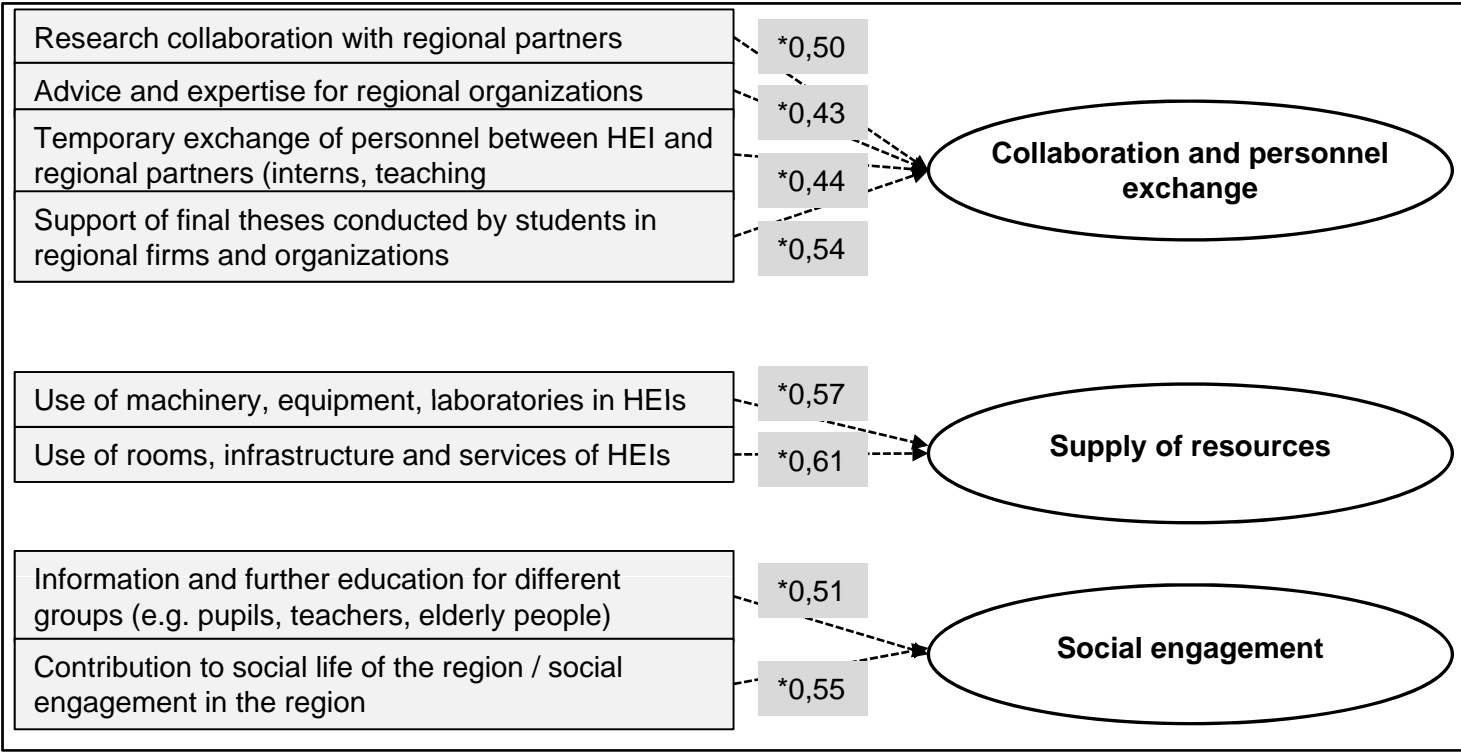
# Scope of activities with regional partners

Frequency of activities in co-operation with regional partners



Source: Own Figure, based on own survey

# Different forms of regional engagement of universities in Germany



n = 1441

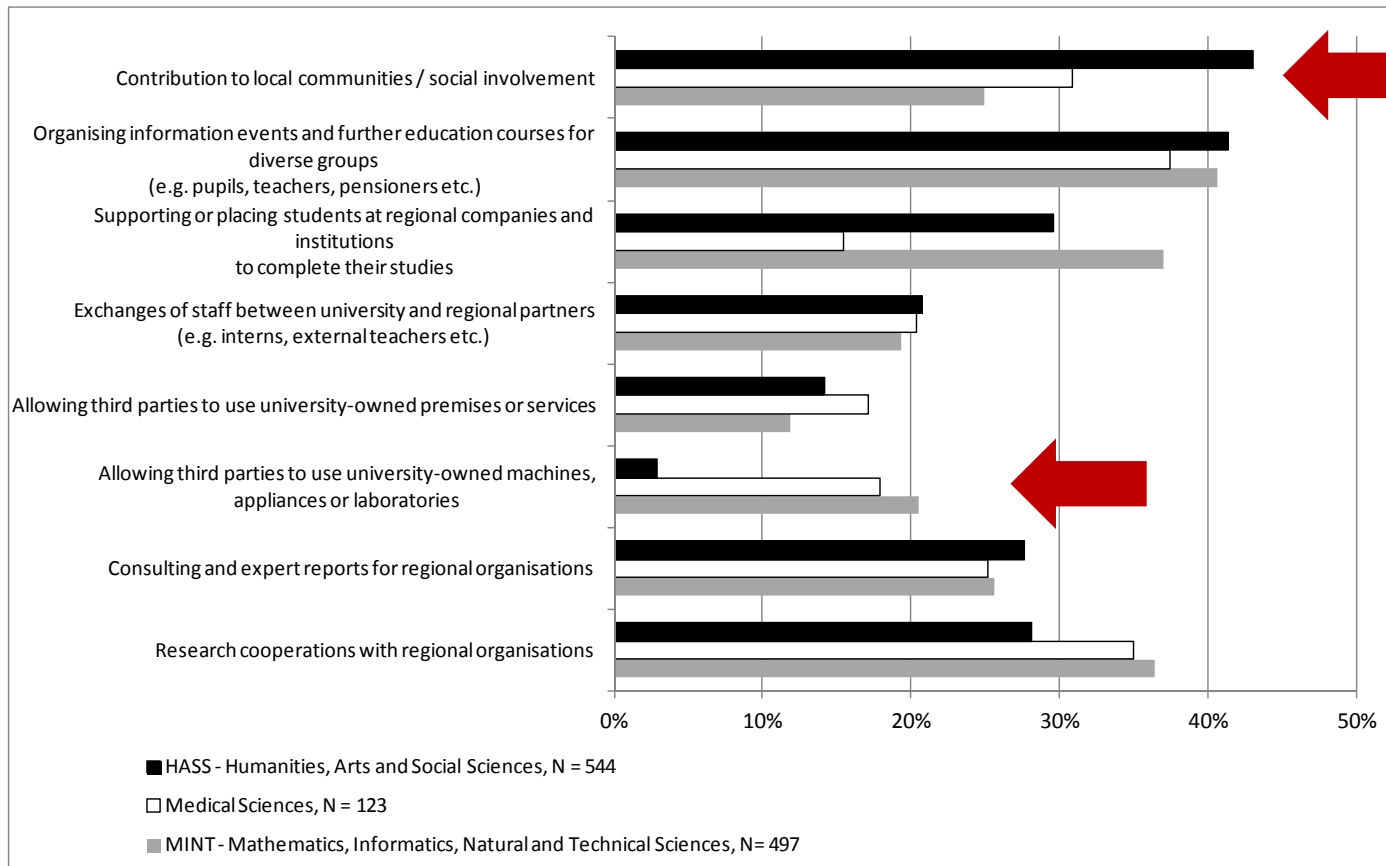
= Indicator     
  \*0,57 → = estimated factor loading     
  = latent variable

\* The highest of the respective factor loadings are shown;  
 Fitting of the sample according to Kaiser-Meyer-Olkin criterion = 0,78

Source: Koschatzky et al. (2013)

# Differences between scientific disciplines

Profile of engagement according to disciplines



Source: Own Figure, based on own survey

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# Interim conclusions

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- **Research collaborations, consulting activities** and **exchange of human capital** via students, graduates and business people are important forms of regional engagement in which spatial and cultural proximity are of high relevance.
- Also important is the **supply of resources** (infrastructure and services).
- **Social engagement** (contribution to social life, further education) plays also a role.
  
- **Conclusion:** The "third role" of German universities is a strong starting point for policy measures.

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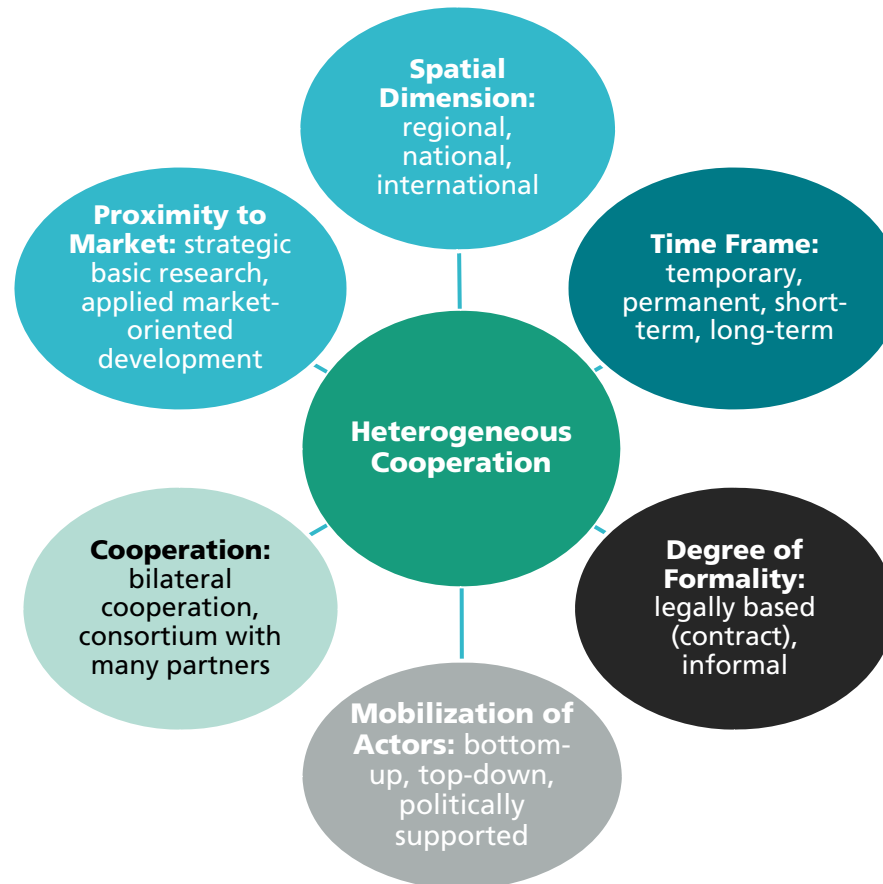
# Distributed innovation processes

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- The recent understanding of innovation as an interactive and systemic process can also be interpreted as a **distributed knowledge sourcing and combining process between different agents**.
- Knowledge generation and implementation processes are supposed to result from **social interaction** between economic actors.
- Distributedness of innovation depends on different influential factors: the **modes** of interrelationships between agents (knowledge base and specialization), the **dynamics** in the distribution patterns of the agents (changes in the distribution patterns), and the **scales** which address the levels of innovation (incremental steps <--> fundamental changes) (Coombs et al. 2003, p. 1126).
- The advantages of distributedness depend on the **absorptive capacity** of firms (Cohen/Levinthal 1990) and on a proper **gatekeeper function** in the firm (Tushman/Katz 1980).

# Heterogeneous cooperations

- Cooperations are **'heterogeneous'** when actors from different sectors of the research system are involved in R&D cooperations (university-industry, industry-public research institution, industry-public organisation), or when different types of cooperation partners with clear distinctions from one sector collaborate (like competitors, suppliers, or other firms serving different markets).



Source: Koschatzky (2013)

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# Changes in the industrial sector

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- In the course of globalization and the increasing science orientation in technology development, the **complexity in technology and product development** increases further.
- Own entrepreneurial **resources** (knowledge, capital) **are often insufficient** to master this complexity.
- This results in **changes in the interface between science and industry** in the German innovation system - (large) companies are looking for access to long-term strategic research.
- Universities and non-university research institutions are attractive **research partners** in this context.

# Transfer Indicators

## Selected indicators of knowledge and technology transfer in international comparison

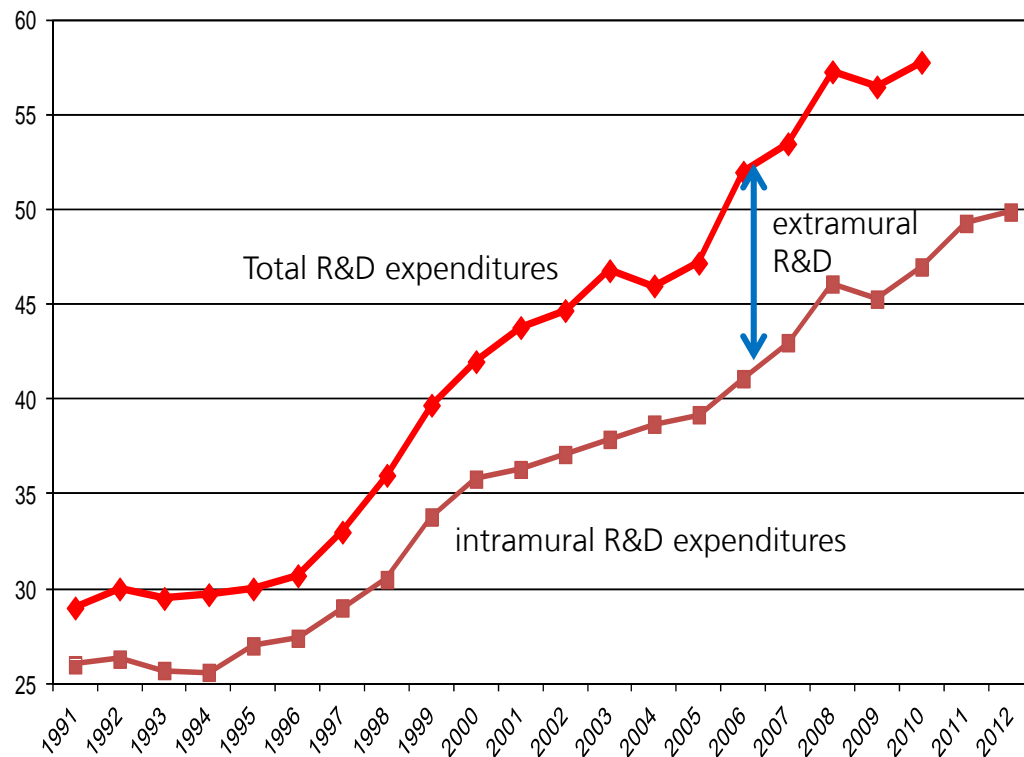
		DE	FRA	GBR	AUT	JAP	KOR	USA
<b>Contract research</b>	R&D activities at universities financed by industry (2009, in %)	14,2	1,6	4,5	5,7	3,0	14,2	5,6
	R&D activities at non-university research institutes financed by industry (2009, in %)	10,8	6,8	9,5	9,3	0,8	4,2	2,7
<b>Innovation cooperation</b>	Share of innovative firms which cooperate with universities (2004, in %)	53,2	25,5	32,7	57,6	n.a.	n.a.	n.a.
	Share of innovative firms which cooperate with non-university research institutes (2004, in %)	25,9	18,4	24,7	30,1	n.a.	n.a.	n.a.

Source: OECD: MSTI 5/2010; Eurostat CIS 2006



# Structural changes in industrial R&D spending in Germany

Bill. Euro



- Since the mid 1990s, total R&D expenditures and the share of external R&D expenditures has increased (outsourcing)
- Other firms and universities profited most
- Most of industrial funded R&D is short-term and market-oriented development
- Only recently, the tendency towards more long-term oriented research increased

Source: Stifterverband Wissenschaftsstatistik, several years

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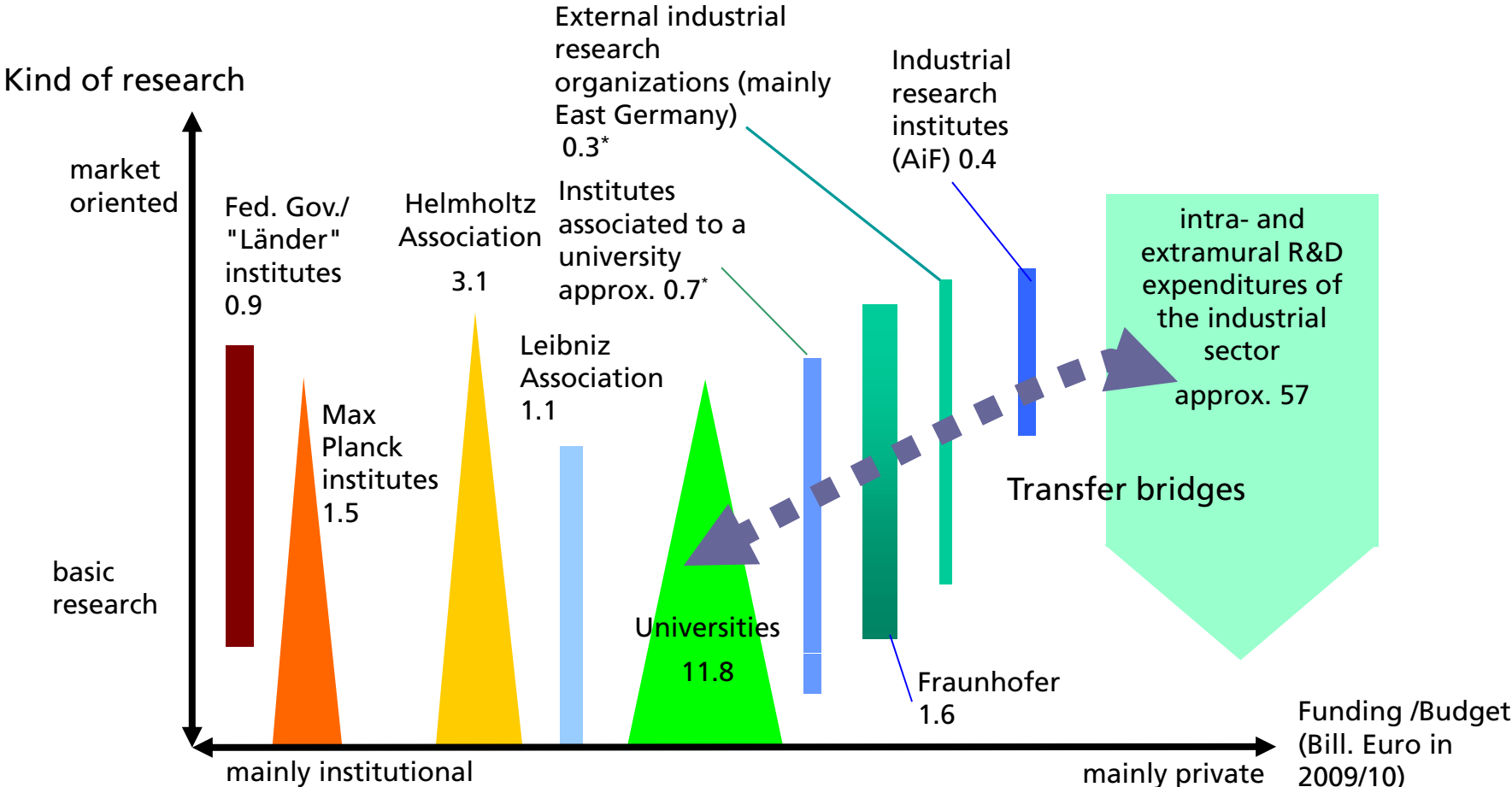
# Public support of heterogeneous cooperations in Germany

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- In its report 2009, the Expert Commission for Research and Innovation (EFI) suggested that strategic cooperations between industry and research organizations should be encouraged and "active political support should be provided for further partnerships" (EFI Report 2009, p. 41).
- Based on this recommendation, BMBF formulated and implemented the funding initiative **"Research Campus" (Forschungscampus)** which is part of the Hightech Strategy 2020.
- Its objective is to promote collaboration between partners from industry and research organizations by **combining resources** in order to **develop new research fields** in a **middle to long-term perspective** in the way of **public-private partnerships** located **at the campus of a university or research institute**.
- **Strategic pre-competitive research** should be strengthened and **leverage effects** by public funding for an increased private investment be created.



# The German research system



Source: BMBF 2012, Stifterverband 2012, other sources

Funding /Budget (Bill. Euro in 2009/10)  
\* estimation

# ResearchCampus

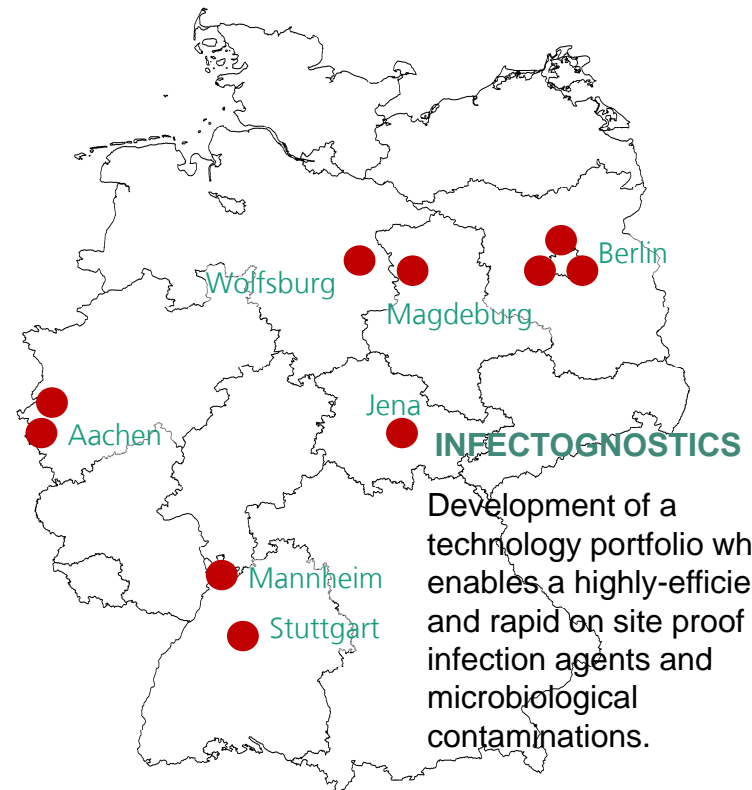


## Three distinct characteristics:

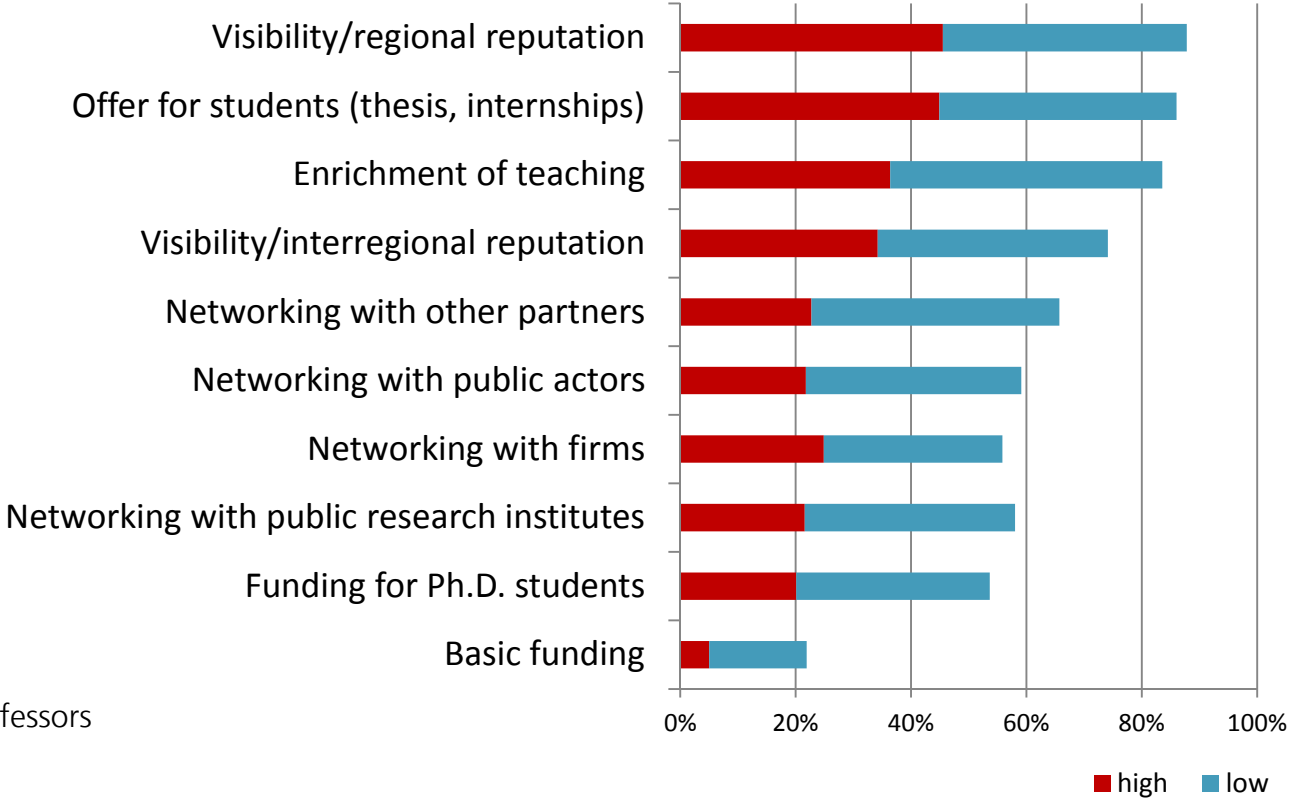
- **Proximity** – the bundling of research activities and competencies at one location, as possible on a university or public research campus,
- The medium- to long-term **adaptation of a specific research topic**, ideally in the frame of a research programme,
- A mandatory **public-private partnership**.

Preparation and main phases will be supported **up to altogether 15 years** with a **maximal amount of 2 mill. Euro per year**.

In September 2012, **ten ResearchCampus projects** were selected.



# Impacts of regional engagement

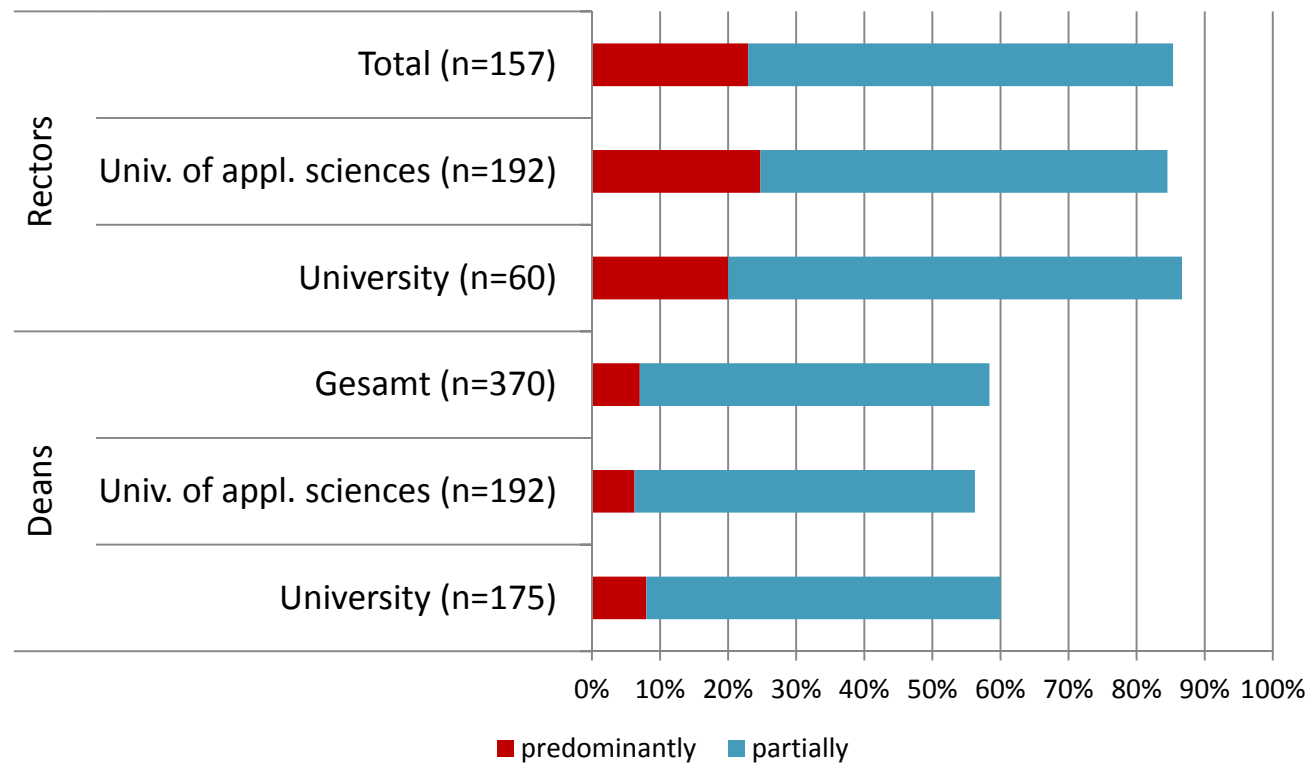


n = 1.250 professors

Source: Own Figure, based on own survey

# Relevance of central coordination

Professors' activities are result of centrally coordinated strategy processes



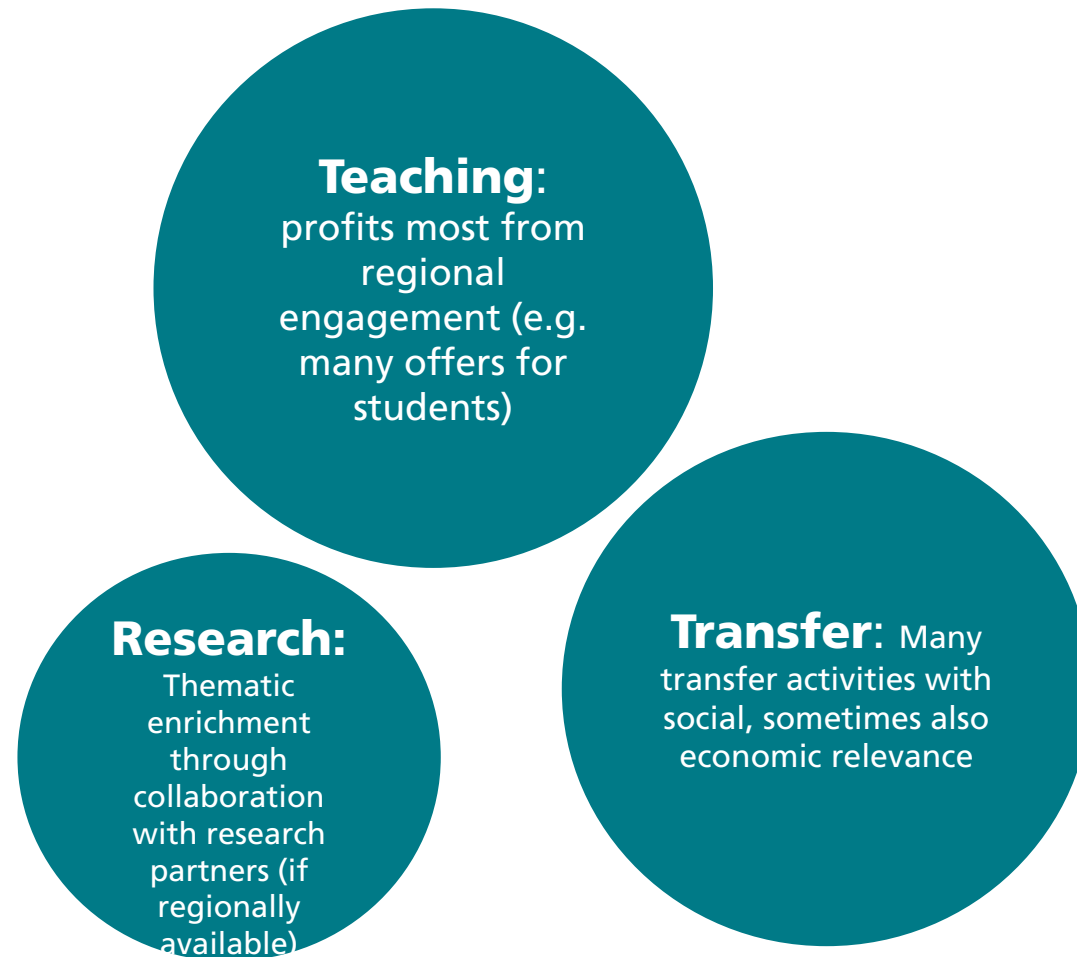
Source: Own Figure, based on own survey

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# Implications for universities

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Conclusions from own survey

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# Conclusions

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- Many German universities interact with their local and regional environment.
- Research collaborations, consulting activities and exchange of human capital via students and graduates are important forms of regional engagement (strong indications for a "third role").
- During the last years the expectations of policy makers and industry towards universities to engage in industry collaborations have significantly increased (e.g. clusters).
- Universities respond to these expectations by manifold activities and also by changing governance modes (involvement of the university administration).
- Politics makes use of this increasing openness by placing universities at the center of strategic innovation supporting programmes (e.g. Research Campus).
- The public responds by questioning the independence of research and professors due to closer linkages to and dependencies on industry.\*
- How universities are affected by this development and which role they have to play in future in the German innovation system are open questions.

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\*e.g., [www.hochschulwatch.de](http://www.hochschulwatch.de)



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# Thank you for your attention!

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